

entific response, as did 22 percent of the high school graduates, compared with 35 percent of the college graduates. Among those classified as attentive to S&T, 34 percent answered correctly. (See appendix table 7-59.)

Conclusion

Although Americans express a high level of interest in S&T, they lack confidence in their knowledge of these subjects. In 2001, less than 15 percent thought that they were well informed about S&T. In addition, few Americans follow news stories about scientific breakthroughs, research, and exploration. Those with more years of formal education and those who have taken more courses in science and mathematics are more likely than others to express a high level of interest in S&T and to believe that they are well informed.

Data on science literacy in the United States indicate that most Americans do not know a lot about S&T. The percentage of correct responses to a battery of questions designed to assess the level of knowledge and understanding of science terms and concepts has not changed appreciably in the past few years. In addition, approximately 70 percent of Americans do not understand the scientific process. Individuals with more years of formal schooling and who have completed more courses in science and mathematics were more likely than others to provide correct responses to the science literacy questions.

Americans have highly positive attitudes toward S&T, strongly support the Federal Government's investment in basic research, and have high regard for the science community. In addition, most people believe that scientists and engineers lead rewarding professional and personal lives, although a stereotypical image of these professions, rooted in popular culture, does exist and has been difficult to dislodge.

Some individuals harbor reservations about science and technology, especially about technology and its effect on society. Although anti-biotechnology sentiments are much more common in Europe, U.S. support for genetic engineering has declined during the past 15 years.

The vast majority of the public believes that global warming exists and that it should be treated as a serious problem. However, Americans think that environmental pollution is not one of the most important problems facing the country today. They are more concerned about economic and especially education issues—more than two-thirds believe that the quality of science and mathematics education in American schools is inadequate.

Belief in pseudoscience is relatively widespread and growing. In addition, the media have come under criticism, especially by scientists, for sometimes providing a distorted view of science and the scientific process and thus contributing to scientific illiteracy.

Americans get most of their information about the latest developments in S&T from watching television, although the Internet is beginning to make inroads. It is now the leading source of information on specific scientific issues. The rapid growth of information technologies, including the Internet, is thoroughly explored in chapter 8, "Significance of Information Technologies."

Selected Bibliography

- American Association of Engineering Societies. 1998. "American Perspectives on Engineers & Engineering." A "Harris Poll" Pilot Study conducted for AAES. Washington, DC: American Association of Engineering Societies..
- American Chemical Society. 2000. National Benchmark Telephone Survey. Wirthlin Worldwide. Draft Report. Washington, DC. July.
- Bainbridge, W.S. 1982. "The Impact of Science Fiction on Attitudes Toward Technology." In E.M. Emme, ed. *Science Fiction and Space Futures: Past and Present*. San Diego, CA: Univelt.
- Barman, C.R. 1997. "Completing the Study: High School Students' Views of Scientists and Science." *Science and Children* 36(7): 16–21.
- . 1997. "Students' Views of Scientists and Science: Results from a National Study." *Science and Children* 35(1): 18–23.
- Barrett, G. 2001. "Can the Living Talk to the Dead? Psychics Say They Connect with the Spirit World, but Skeptics Respond: 'Prove It'." *USA Today*, June 20.
- Bayer Corporation and the National Science Foundation. 2000. Bayer Facts of Science Education VI: Science, Technology and Society. June. Princeton, NJ: The Gallup Organization.
- Bayer Corporation and the National Science Foundation. 2001. The Bayer Facts of Science Education VII: The State of America's New Workforce. April. Merriam, KS: Market Research Institute.
- Borger, J. 2001. "Conspiracy Theory Turns to Moonshine." *Guardian Unlimited* April 10. Available at <<http://www.guardian.co.uk/Archive/Article/0,4273,4168307,00.html>>.
- Brooks, D.J. 2001. "Substantial Numbers of Americans Continue to Doubt Evolution as Explanation for Origin of Humans." *Gallup News Service*. Poll analyses. March 5. Available at <<http://www.gallup.com/poll/releases/pr010305.asp>>.
- Brown, I. 2000. "Hearing from Dearly Departed Proves a Hit on Sci Fi Channel." *Los Angeles Times*. March 5.
- Carlson, D.K. 2001. "Public Views NASA Positively, but Generally Disinterested in Increasing its Budget." *Gallup News Service*. Poll analyses. March 8. Available at <<http://www.gallup.com/poll/releases/pr010308b.asp>>.
- Carroll, J. 2001. "Americans Oppose Human Cloning." *Gallup News Service*. Poll analyses. June 27. Available at <<http://www.gallup.com/poll/releases/pr010627c.asp>>.
- Carter, B.. 2001. "TV Notes: No More Mr. Nice Guy." *New York Times*. March 14.
- Chambers, D.W. 1983. "Stereotypic Images of the Scientist: The Draw-A-Scientist Test." *Science Education* 67(12): 255–65.
- Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development. 2000. *Land of Plenty: Diversity as America's Competitive Edge in Science, Engineering and Technology*. Arlington, VA: National Science Foundation.

- Davis, P.J. 2001. "Making Mathematics Part of the Equation of Life." *Chronicle of Higher Education*. April 13.
- Davis, J.A. and T.W. Smith. Annual Series. *General Social Surveys, Cumulative Codebook*. Annual Series. Chicago: University of Chicago, National Opinion Research Center.
- Dawkins, R. 1998. *Unweaving the Rainbow: Science, Delusion, and the Appetite for Wonder*. Boston: Houghton Mifflin Company.
- Duffy, T., S. Muzzy, and W. Robb. Forthcoming. *Survey of Public Attitudes Toward and Understanding of Science and Technology: Methodological Report*. New York: ORC Macro.
- Dunlap, R.E., and L. Saad. 2001. "Only One in Four Americans Are Anxious About the Environment." *Gallup News Service*. Poll analyses. April 16. Available at <<http://www.gallup.com/poll/releases/pr010416.asp>>.
- Eisenberg, D.M., R.B. Davis, S.I. Ettner, and others. 1998. "Trends in Alternative Medicine Use in the United States, 1990–1997: Results of a Follow-up National Survey." *Journal of the American Medical Association* 280: 1569–75.
- Fort, D.C. and H.L. Varney. 1989. "How Students See Scientists: Mostly Male, Mostly White and Mostly Benevolent." *Science and Children* 26(8): 8–13.
- Gallup News Service. 2000. "Kansas Voters Fail to Re-Nominate Anti-Evolution School Board Members." *Gallup News Service*. Poll analyses. August 2. Available at <<http://www.gallup.com/poll/releases/pr000802b.asp>>.
- Gallup News Service. 2001. "Did Men Really Land on the Moon?" *Gallup News Service*. Poll analyses. February 15. Available at <<http://www.gallup.com/poll/releases/pr010215f.asp>>.
- Gallup Organization. Gallup Poll Topics: A-Z. "Health and Health Care."
- Gallup Poll Editors. 2001. "Education Reform: The Public's Opinion." *Gallup News Service*. Poll analyses. January 24. Available at: <<http://www.gallup.com/poll/releases/pr010124b.asp>>.
- Gaskell, G., Allum, N., Bauer, M., Durant, J., et al. 2000. "Biotechnology and the European Public." *Nature Biotechnology* 18 (September): 935–938.
- Gaskell, G., and Bauer, M.W., eds. 2001. *Biotechnology 1996–2000: The Years of Controversy*. London: Science Museum Press and East Lansing, MI: Michigan State University Press.
- Gendall, P., Smith, Tom W., and Russell, D. 1995. "Knowledge of Scientific and Environmental Facts: A Comparison of Six Countries." Available at <http://marketing-bulletin.massey.ac.nz/articles6/comtary1b.asp>.
- Gerbner, G., and B. Linson. 1999. "Images of Scientists in Prime Time Television: A Report for the U.S. Department of Commerce for the Cultural Indicators Research Project." Unpublished report. Washington, DC: U.S. Department of Commerce.
- Goldman, S.L. 1989. "Images of Technology in Popular Films: Discussion and Filmography." *Science, Technology, and Human Values* (Summer): 275–301.
- Goldstein, K. 2001. "\$28 Million in Political TV Issue Ads Since January." Press Release. University of Wisconsin. Available at <http://www.polisci.wisc.edu/tvadvertising/>.
- Gup, T. 2000. "Life is an Essay, Not Multiple Choice." *Washington Post*, August 6.
- Hebel, S. 2000. "U.S. Workers Value General Skills Over Specific Ones, Survey on Education Finds." *The Chronicle of Higher Education*. June 14. John J. Heldrich Center for Workforce Development, Rutgers University Center for Survey Research Analysis, University of Connecticut "Making the Grade? What American Workers Think Should Be Done to Improve Education."
- Hopkin, K. 2001. "The Risks on the Table." *Scientific American*, April. Available at <<http://www.sciam.com/2001/0401issue/0401hopkin.html>>.
- Houghton, J.T., Ding, Y., Griggs, D.J., Noguer, M., van der Linden, P.J., and Xiaosu, D., eds. 2001. *Climate Change 2001: The Scientific Basis*. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Cambridge, UK: Cambridge University Press.
- International Food Information Council. 2000. "U.S. Consumer Attitudes Toward Food Biotechnology." Wirthlin Group Quorum Surveys October 8–12, 1999, February 5–8, 1999, March 21–24, 1997, and May 5–9, 2000. Available at <<http://www.ific.org/proactive/newsroom/release.vtml?id=18001>>.
- International Food Information Council. 2001. "What Consumers Have to Say about Food Biotechnology." *NewsBite. Food Insight* March/April 2001. Available at <<http://www.ific.org/proactive/newsroom/release.vtml>>.
- Irwin, H. 1993. "A Study of the Measurement and the Correlates of Paranormal Belief." *Journal of the American Society for Psychological Research* 79: 301–26.
- Jenkins-Smith, H.C., C.L. Silva, A. Vedlitz, and G.D. Whitten. 2001. "Technological Controversies and Complex Publics: Benefits, Risks and Acceptance of Genetically Modified Organisms." University of New Mexico Institute for Public Policy and Texas A&M University Institute for Science, Technology, and Public Policy. Presented before the National Science Foundation, May.
- Kansas City Star-Wichita Eagle. 1999. "Evolution Poll Results." November 7. Available from <<http://www.kcstar.com/news/stories/evpoll.htm>>.
- Kimmel, L. 1997. "Public Attitudes about the Use of Animals in Scientific Research." Paper presented at a conference, "Hot Topics about Research Animal Welfare." Sponsored by the Scientists Center for Animal Welfare and The University of Texas Health Science Center at San Antonio, Texas (December 11–12).
- Kolata, G. 2000. "A Hit Movie is Rated 'F' in Science." *New York Times*, April 11.
- Lewenstein, B. Forthcoming. "Science Books Since World War II." *History of the Book in America*, vol. 5. Cambridge, U.K.: Cambridge University Press.
- Maienschein, J., et al.. 1999. "Commentary: To the Future. Argument for Scientific Literacy." *Science Communication* (September): 101–13.

- Mead, M., and R. Metraux. 1957. "Image of the Scientist among High School Students: A Pilot Study," *Science* 126: 386-87.
- Miller, J.D., and L. Kimmel. 1999. *Public Attitudes Toward Science and Technology, 1979–1999, Integrated Codebook*. Chicago: International Center for the Advancement of Scientific Literacy, Chicago Academy of Sciences.
- . 2001. *Procedures for Coding Verbatim Responses to Open-ended Questions*. Chicago: International Center for the Advancement of Scientific Literacy, Chicago Academy of Sciences.
- Miller, J.D., L. Kimmel, and M. Hess. 2000. *1999 Study of Public Attitudes Toward and Understanding of Science and Technology: Methodological Report*. Chicago: Chicago Academy of Sciences.
- Miller, J.D., C. Midden, E. Einsiedel, and L. Kimmel. 1999. Attitudes toward Biotechnology in Canada, the European Union, and the United States. Unpublished manuscript.
- Miller, J.D., R. Pardo, and F. Niwa. 1997. *Public Perceptions of Science and Technology: A Comparative Study of the European Union, the United States, Japan, and Canada*. Chicago: Chicago Academy of Sciences.
- Miller, J.D., and K. Prewitt. 1979. "The Measurement of the Attitudes of the U.S. Public Toward Organized Science." Report to the National Science Foundation under Contract SRS78-16839. Chicago: National Opinion Research Center.
- Miller, J.D., K. Prewitt, and R. Pearson. 1980. "The Attitudes of the U.S. Public Toward Science and Technology." Report to the National Science Foundation under NSF Grant 8105662. DeKalb, IL: Public Opinion Laboratory.
- Moore, D.W. 2001. "Microsoft Still Enjoys Public Favor." Poll Analyses. July 5, 2001. *Gallup News Service*. July 5. Available at: <<http://www.gallup.com/poll/releases/pr010705b.asp>>.
- National Science Board. 1999. "National Science Board Statement on the Action of the Kansas Board of Education on Evolution." NSB 99-149 (August 20). Available at <<http://www.nsf.gov/cgi-bin/getpub?nsb99149>>.
- . 2000. *Communicating Science and Technology in the Public Interest*. NSB-00-99. Arlington, VA: National Science Foundation. Available at <<http://www.nsf.gov/cgi-bin/getpub?nsb0099>>.
- National Science Foundation. 2001. *Survey of Public Attitudes Toward and Understanding of Science and Technology 2002*. Arlington, VA: National Science Foundation.
- Newport, F., and L. Saad. 2001. "Americans Consider Global Warming Real, but Not Alarming." *Gallup News Service*. Poll analyses. April 9. Available at <<http://www.gallup.com/poll/releases/pr010409.asp>>.
- Newport, F., and M. Strausberg. 2001. "Americans' Belief in Psychic and Paranormal Phenomena Is up Over Last Decade." *Gallup News Service*. Poll analyses. June 8. Available at: <<http://www.gallup.com/poll/releases/pr010608.asp>>.
- Office of Science and Technology and The Wellcome Trust. 2000. "Science and the Public: A Review of Science Communication and Public Attitudes to Science in Britain." October 2000.
- Park, R. 2000. Letter to the *Washington Post Book World*. July 23.
- Park, R. 2000. *Voodoo Science: The Road from Foolishness to Fraud*. New York: Oxford University Press.
- People for the American Way Foundation. 2000. *Evolution and Creationism in Public Education: An In-depth Reading of Public Opinion*. Survey prepared by DYG, Inc. Washington, DC: People for the American Way. Available at <http://www.pfaw.org/issues/education/creationism-poll.pdf>.
- Pew Research Center for the People and the Press. 2001. Public Agenda Online. Survey conducted by Princeton Survey Research Associates. Available at http://www.publicagenda.org/issues/major_proposals_detail2.cfm?issue_type=medical_research&proposal_graphic=mpspending.gif.
- Pew Research Center for the People and the Press. 1997. "America's Place in the World II: More Comfort with Post-Cold War Era." October 10. Available at <<http://www.people-press.org/apw2rpt.htm>>.
- Pew Research Center for the People and the Press. 1999a. "Optimism Reigns, Technology Plays Key Role: Americans Look to the 21st Century." October 24. Available at <<http://www.people-press.org/mill2rpt.htm>>.
- Pew Research Center for the People and the Press. 1999b. "Technology Triumphs, Morality Falts: Public Perspectives on the American Century." July 3. Available at <<http://www.people-press.org/mill1rpt.htm>>.
- Pew Research Center for the People and the Press. 2000a. "Education and Maintaining Prosperity Are Top 2000 Priorities." January 19. Available at <<http://www.people-press.org/jan00mor1.htm>>.
- Pew Research Center for the People and the Press. 2000b. "Internet Sapping Broadcast News Audience: Investors Now Go Online for Quotes, Advice." Biennial Media Consumption survey. June 11. Available at <<http://www.people-press.org/media00rpt.htm>>.
- Pew Research Center for the People and the Press. 2000c. "Rising Price of Gas Draws Most Public Interest in 2000." December 25. Available at <<http://www.people-press.org/top00rpt.htm>>.
- Pew Research Center for the People and the Press. 2000d. "Public Attentiveness to News Stories: 1986-2000." News Interest Index: A record of public attentiveness to news stories. Available at <<http://www.people-press.org/database.htm>>.
- Pfau, M., J. Cho, and K. Chong. 2001. "Communication Forms in U.S. Presidential Campaigns: Influences on Candidate Perceptions and the Democratic Process." *Harvard International Journal of Press/Politics*. 6(4): 88–105.
- Priest, S.H. 2000. "U.S. Public Opinion Divided over Biotechnology?" *Nature Biotechnology* 18 (September): 939–42.

- Prime Minister's Office. 1995 "Public Opinion Survey of Relations of Science and Technology to Society." Survey taken in February 1995, and "Public Opinion Survey of Future Science and Technology." 2001. Survey taken in October 1998. *S&T Today* 14(6):12. Tokyo: Japan Foundation of Public Communication on Science and Technology.
- Rahm, J., and P. Charbonneau. 1997. "Probing stereotypes through students' drawings of scientists." *American Journal of Physics* 65(8): 774–78.
- Reid, T.R. 2001. "In Europe, the Ordinary Takes a Frightening Turn." *Washington Post* March 1,
- Rensberger, B. 2000. "The Nature of Evidence." *Science* 289(July): 61.
- Research!America. 2001. Research!America. Poll Data Booklet. Volume 2. Alexandria, VA: Research!America.
- Rosa, L., Rosa, E., Sarner, L., and Barrett, S. 1998. "A Close Look at Therapeutic Touch." *Journal of the American Medical Association*. 279(13): 1005–10.
- Saad, L. 2001. "Biotech Food Remains Fairly Obscure to Most Americans." *Gallup News Service*. Poll analyses. August 6. Available at <<http://www.gallup.com/poll/releases/pr010806.asp>>.
- Shanahan, J., D. Scheufele, and E. Lee. 2001. "The Polls—Trends: Attitudes about Agricultural Biotechnology and Genetically Modified Organisms." *Public Opinion Quarterly* 65(2): 267–81.
- Sheffield, L.J. 1997. "From Doogie Howser to Dweebs—or How We Went in Search of Bobby Fischer and Found that We are Dumb and Dumber." *Mathematics Teaching in the Middle School* 2(6): 376–79.
- Shermer, M. 1997. *Why People Believe Weird Things: Pseudoscience, Superstition, and Other Confusions of Our Time*. New York: W.H. Freeman and Company.
- "Six that will Define our Future." 2000 *Popular Science* January: 47–61
- Sparks, G.G., C.L. Nelson, and R.G. Campbell. 1997. "The Relationship Between Exposure to Televised Messages About Paranormal Phenomena and Paranormal Beliefs." *Journal of Broadcasting & Electronic Media* 41(summer): 345–59.
- Taylor, H. 2000. "Doctors Seen as Most Prestigious of Seventeen Professions and Occupations, Followed by Scientists (#2), Teachers (#3), Ministers/Clergy (#4) and Military Officers (#5). Harris Interactive. The Harris Poll. Available at http://www.louisharris.com/harris_poll/index.asp?PID=111.
- TIME/CNN Poll, Friday, March 16, 2001. Available at <http://www.time.com/time/health/printout/0,8816,99005,00.html>.
- Tsou, C-L. 1998. "Science and Scientists in China." *Science* 280(April 24): 528–29.